

Application No. 09/913,448

Filed: August 14, 2001

TC Art Unit: 1774

Confirmation No.: 9630

REMARKS

The claims in the above-identified application have been rejected as indefinite and/or as obvious over Reuscher et al. These rejections are respectfully traversed for the reasons indicated below and reconsideration is requested.

Indefiniteness rejections

Claim 5 has been amended to delete the term "phosphates" in line 3 and "preferably selected from sodium hydrogen phosphate, sodium dihydrogen phosphate and sodium hypophosphite" in lines 6-8, as suggested by the Examiner.

Claims 7 and 8 have been amended to change the limitations on x and y. Claim 8 has been amended further to delete "preferably" in the definition of "[CD]."

Claim 9 has been amended to delete "preferably selected from." Claim 13 has been amended to delete "solid." Claim 20 has been cancelled.

Therefore, Applicants submit that the rejections for indefiniteness have been overcome.

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Rejection Under §103(a)

1. Claims 4-20 have been rejected as obvious over Reuscher et al., US Pat. No. 5,728,823 (Reuscher). Reucher teaches reactive cyclodextrin derivatives that contain at least one nitrogen-containing heterocycle having at least one electrophilic center (columns 1-4. Reucher also teaches processes for the preparation of these cyclodextrin derivatives (columns 4-7). According to a third aspect, Reucher teaches polymers to which 0.1 to 100% by weight of at least one reactive cyclodextrin derivative having at least one nitrogen-containing heterocycle is covalently bonded (columns 9-10). Furthermore, Reucher teaches processes for the preparation of said polymers (columns 11-13). According to a fifth aspect, Reucher relates to a textile material that is finished with 0.1 to 25% by weight, of at least one reactive cyclodextrin derivative having at least one nitrogen-containing heterocycle (columns 13-14) and to processes for the preparation of said materials (columns 14-18).

Among all these aspects, only the last two are of interest in connection with the object of the present, above-identified application. Specifically, Reuscher teaches a process comprising the following steps (column 14, lines 20-29):

- dissolving the reactive cyclodextrin derivatives in a suitable reaction medium (liquor) with addition of base, and, if appropriate, of salts and additives to the reaction medium;

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- applying the reactive cyclodextrin derivatives in the resulting neutral to basic medium to the materials (in particular, to a fiber, a filament, a yarn, a web, a sheet-like structure) or leather;
 - optionally drying the materials or the leather;
 - fixing at temperatures of 20-220°C.
2. Independent claim 11 of the present application is directed to a process for treating a fiber, consisting of:
- a. impregnating said fiber with an aqueous solution of a mixture to form an impregnated fiber, said mixture comprising:
 - i. one or more materials from the group consisting of cyclodextrins, cyclodextrin derivatives, inclusion complexes of cyclodextrins, and inclusion complexes of cyclodextrin derivatives, and
 - ii. one or more materials selected from the group consisting of poly(carboxylic) acids and poly(carboxylic) acid anhydrides;
 - b. drying said impregnated fiber at a temperature in the range of 40 to 150°C to obtain a treated fiber ;
 - c. heating said treated fiber to a temperature between 150-220°C;
 - d. washing said treated fiber with water; and
 - e. drying said treated fiber.

Specifically, the reaction medium applied to materials or leather in Reuscher comprises:

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- reactive cyclodextrin derivatives at 0.5-70% by weight;
- bases at 0.2-20% by weight;
- optionally, salts at 0-30% by weight; and
- optionally, additives at 0-30% by weight.

3. Applicants respectfully point out to the Examiner that the Reuscher reaction medium just given does not contain poly(carboxylic) acids or poly(carboxylic) acid anhydrides, which are required ingredients of the mixture used for impregnating a fiber or fiber-based material in the present application, as recited in claim 11. Poly(carboxylic) acids or poly(carboxylic) acid anhydrides are involved in the present application in the fixation of cyclodextrin molecules onto the fiber or fiber-based material, either by a first mechanism (one or more molecules of cyclodextrin or cyclodextrin derivative(s) is bonded via an ester function to a molecule of poly(carboxylic) acid which is itself bonded to a fiber via a covalent bond), and/or by a second mechanism which may occur in parallel or independently of the first mechanism (coating of a fiber or a fiber-based material with a cross-linked polymer composed of cyclodextrin and/or cyclodextrin derivative(s) and at least one poly(carboxylic) acid).

In Reuscher, however, cyclodextrin is covalently bonded directly to the textile materials or leather. No element disclosed by Reuscher would incite a person skilled in the art to use a mixture comprising poly(carboxylic) acids or poly(carboxylic) acid anhydrides in order to

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fix a cyclodextrin or a cyclodextrin derivative to a fiber or fiber-based material.

The Examiner argues, however, that a polycarboxylic acid of the type contemplated by Applicants is disclosed in Reuscher at col. 6, line 55. With respect, Applicants point out that at the cited place, Reuscher refers to a citrate buffer and not to citric acid in a capacity that could be construed to satisfy the limitation in the first step of claim 11 of "impregnating said fiber with an aqueous solution of a mixture to form an impregnated fiber, said mixture comprising . . . one or more materials selected from the group consisting of poly(carboxylic) acids and poly(carboxylic) acid anhydrides." In this step, the polycarboxylic acid is one of at least two components in a mixture that is going to impregnate a fiber to be treated. In contrast, in Reuscher, citric acid at the cited place would be present in buffering quantities.

4. As indicated above, the reaction medium used in Reuscher contains bases, and it is applied at a neutral or basic pH to the materials or leather. The three types of finishing processes detailed in columns 15-16 specify that pH is at least 9. In contrast, in the present application, the mixture used for impregnating a fiber or fiber-based material is acidic due to the presence of poly(carboxylic) acids or poly(carboxylic) acid anhydrides, as mentioned above.

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A person skilled in the art taking Reuscher into account would not be motivated to work in an acidic medium in order to fix cyclodextrin or cyclodextrin derivative(s) to a fiber or fiber-based material.

5. In other differences, the reaction medium used in Reuscher contains reactive cyclodextrin derivatives having at least one nitrogen-containing heterocycle. The process for the preparation of said reactive cyclodextrin derivatives is described in column 4, lines 33-46. The present invention relates to fibers obtained by impregnation with an aqueous solution of a mixture containing native cyclodextrin or cyclodextrin derivatives and poly(carboxylic) acids or poly(carboxylic) acid anhydrides. No modification of said cyclodextrin or cyclodextrin derivatives is requisite to their reaction with poly(carboxylic) acids or poly(carboxylic) acid anhydrides, in order to fix to said fiber.

The teachings of Reuscher (specifically, chemically modified cyclodextrin capable of being fixed directly to a fiber) do not suggest to a man skilled in the art the possibility of fixing a native cyclodextrin or cyclodextrin derivative onto a fiber or fiber-based material by said first and/or second mechanism (as described above).

6. The reaction medium in Reuscher used in the process of treating a textile material that is finished with 0.1 to 25% by weight of at least one reactive cyclodextrin derivative having at least one nitrogen-containing heterocycle, does not contain a catalyst. Besides reactive

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cyclodextrin derivatives and bases, it may contain salts or additives. Said additives are urea or alginate.

In contrast, in the present application, in certain embodiments, a catalyst is used in the process of treating a fiber or fiber-based material according to the invention. In this case, the catalyst increases the reaction speed between a cyclodextrin or a cyclodextrin derivative and a poly(carboxylic) acid or a poly(carboxylic) acid anhydride, by forming an intermediate form (activated ester) with a poly(carboxylic) acid.

7. Additionally, in regard to claim 8, the Applicants further state the following. According to the Examiner, Reuscher does not specifically teach a crosslinked polymer as required in claim 8 of the present application, but he teaches nonetheless that crosslinkers can be included. The Examiner concludes that it would have been obvious to crosslink the coating to enhance the linkage between the fibrous material and cyclodextrin coating material.

Reuscher teaches that reactive cyclodextrin derivatives are able to react with compounds which carry two or more nucleophilic groups, allowing crosslinking of the cyclodextrin derivatives or the formation of nucleophiles which carry the nucleophilic group on a spacer (column 8, line 60 to column 9, line 4). In this case, crosslinking would be made possible by the presence of several reactive groups on each cyclodextrin molecule. However, the reaction medium applied to

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materials or leather as taught in Reuscher for the preparation of textile materials treated with reactive cyclodextrine derivatives does not contain any of the compounds which carry two or more nucleophilic groups indicated at column 8, line 64 - column 9, line 4. No crosslinking between the fibrous material and cyclodextrin would have been possible in these conditions.

In contrast, in the present application, crosslinking (as recited in claim 8) results from a molar excess of poly(carboxylic) acid over cyclodextrin or cyclodextrin derivative. Therefore, in this case crosslinking is the consequence of a specific utilisation of the poly(carboxylic) acid and is independent of the structure of the cyclodextrin.

Based on the arguments presented above, the Applicants submit that a person skilled in the art taking Reuscher into account would not be motivated to carry out the process of claim 11 or the claims dependent thereon, or to make the fiber of claims 7 or 8, or of the claims dependent thereon. The test of obviousness requires that one compare the subject matter of the claims as a whole with prior art to which said subject matter pertains. When the references cited by the Examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned (In Re Fine 837 F.2d 1071, 1074, 5 USPQ 2D BNA 1596, 1986 Fed. Cir. 1988).

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Reuscher does not mention the use of a poly(carboxylic) acid or a cross-linked polymer that finishes a textile material. The mere possibility that the compounds disclosed in Reuscher could be modified or replaced such that it would lead to the invention as claimed does not make the claims obvious unless the prior art suggests the desirability of such modification or replacement (In Re Gordon 221 USPQ BNA 1125, 1125, Fed. Cir. 1984).

The Applicants submit that the rejections having been overcome, all claims are in condition for allowance. Such action is respectfully requested.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

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